

REMARKS/ARGUMENTS

Claims in general

Claim 13 has been amended, Claims 26-39 have been newly added, so as to distinguish the present invention from the cited references and to eliminate the rejection under the 35 USC § 103(a). Support for this amendment is founded in the remainder of the specification. No new matter has been added to the application through the amended claims and allowance of the application is earnestly solicited.

Rejection of claims 13 and 15 under 35 USC § 103(a)

The Examiner rejected Claims 13 and 15 under 35 U.S.C. 103(a) as being unpatentable over either Chua. (Pub. No.: US 20030231683) in view of Kawasaki (Pub. No.: 08-250804).

In the amended claim 13, Claim 13 is directed to a light emitting diode having a plated substrate with a mirror, comprising: an LED epitaxial structure sequentially comprising a second cladding layer, an active layer, a first cladding layer, a window and a metal contact layer, wherein said second cladding layer is partially exposed; a first electrode formed on said metal contact layer; a second electrode formed on said exposed second cladding layer; a mirror formed beneath said LED epitaxial structure; and a copper substrate plated beneath said mirror and retaining sawing streets without plating the substrate thereon; wherein said mirror is made from a composite of a metal layer with low refractivity and an insulating layer with high refractivity, adjacent to the LED epitaxial structure, selected from the group consisting of: Al/MgF₂, Pt/Al₂O₃, Pt/SiO₂, Pt/MgF₂, Au/SiO₂, Au/MgF₂, Ag/MgF₂.

As described above, Chua. (Pub. No.: US 20030231683) in view of Kawasaki (Pub. No.: 08-250804) fail to teach or suggest the permanent substrate is a copper substrate, and fail to teach or suggest *said mirror is made actually from a composite of*

a metal layer with low refractivity and an insulating layer with high refractivity, adjacent to the LED epitaxial structure.

The Applicant wants to point out:

1. Regarding to **rejection of claims 13**, the mirror described in Chua's disclosure is a metal terminated layer stack of dielectric materials, such as SiO₂ and Ta₂O₅ (paragraph 0057). Namely, the mirror described in Chua's disclosure is using two stacked *dielectric* materials. It is so different from that of our disclosure. The mirror described in present invention is made **actually** from a composite of a metal layer with low refractivity and an insulating layer with high refractivity, adjacent to the LED epitaxial structure. *Only by using this structure, the copper substrate plated beneath the metal layer of the mirror can be fabricated.* However, Chua. (Pub. No.: US 20030231683) in view of Kawasaki (Pub. No.: 08-250804) fail to teach or suggest the mirror is made **actually** from a composite of a metal layer and an insulating layer. Especially, the metal layer is with low refractivity and the insulating layer is with high refractivity and adjacent to the LED epitaxial structure.

2. Regarding to **rejection of claim 15**, the electrode 118 described in Chua's disclosure is typically a transparent conductive material such as Indium Tin Oxide (ITO) or Zinc oxide. However, Chua's disclosure claims electrode 118 allows uniform current injection in cases where the contact layer 114 is highly resistive and **it is not necessary if the contact layer 114 can be made sufficiently conductive.** However, in the present invention, the transparent conductive film is between said first electrode and said metal contact layer. Namely, **even the first electrode and said metal contact layer are both sufficiently conductive, the transparent conductive film is still existed and inserted between the first electrode and said metal contact layer in this invention.**

3. The inventor adds a new dependent claim regarding to that the metal contact layer remains only the portion beneath the first electrode, so that the emitted light absorbed by the metal contact layer can be decreased. However, Chua. (Pub. No.: US 20030231683) in view of Kawasaki (Pub. No.: 08-250804) fail to teach or suggest the

argument.

4. Regarding to **rejection of claims 13 and 15**, in present invention, we claim the LED epitaxial structure sequentially comprising a second cladding layer, an active layer, a first cladding layer, a window and a metal contact layer. Namely, the first cladding layer, the window and the metal contact layer are *different layers*. However, in Chua. (Pub. No.: US 20030231683) disclosure, the first cladding layer, the window and the metal contact layer **use the same layer or only two layers**. It is so different. In present invention, the first cladding layer, the window and the metal contact layer *have independent and its own function*, which are not taught or suggested by Chua. (Pub. No.: US 20030231683) in view of Kawasaki (Pub. No.: 08-250804).

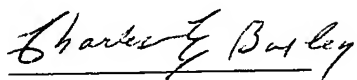
5. The permanent substrate can be a copper substrate. Preferably, the copper substrate is electroless plated beneath the metal layer. By using this electroless plated copper, the manufacture cost can be effectively reduced, and the production yield is promoted. Since the electrodes are completed before plating the copper substrate, the damage to the LED epitaxial structure can be prevented.

Using the same reasons addressed above, two new independent claims 29 and 34 are added and dependent claims 26-28, 30-33, and 35-39 are newly added without adding new materials.

The Applicant believes that the amendments and remarks/arguments are a complete response to the Examiner's rejections, and thus respectfully requests that a timely Notice of Allowance be issued in this case.

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Respectfully submitted,

A handwritten signature in cursive script that reads "Charles E. Baxley". The signature is written in dark ink and is positioned above a horizontal line.

Charles E. Baxley, Esquire

Hart, Baxley, Daniels Holton
90 John Street-Suite 309
New York, N.Y. 10038-3243
Tel: (212) 791-7200
Fax: (212) 791-7276
E-Mail: ceb@hartbaxley.com